

CLAIMS

What is claimed is:

1. A rotary liquid/gas separator assembly for separating a low pressure liquid/gas mixture into liquid and gas components, said assembly comprising:

a housing defining a separator chamber;

a liquid/gas inlet;

a shaft supported for rotation about a longitudinal axis within said separator chamber and having a hollow section in communication with a gas outlet;

a drive to rotate said shaft;

a plurality of disks attached to rotate with said shaft, said disks in frictional contact with said liquid such that rotation of said disks creates centrifugal force driving said liquid toward inner walls of said separator chamber;

a level control valve that closes in response to a predetermined pressure differential between liquid in said feed line and liquid within said separator chamber;

an outlet valve that opens in response to an increase in pressure above a predetermined level; and

a liquid feed passage communicating liquid from said separator chamber to a pump, said pump increases liquid pressure above said predetermined level to open said outlet valve.

2. The assembly of claim 1, wherein said pump includes a piston actuated within a pump chamber, said piston pumps liquid from said feed passage out to said outlet valve and said level control valve.

3. The assembly of claim 2, wherein a swash plate driven by said shaft actuates said piston within said pump chamber.

4. The assembly of claim 2, wherein said piston is a ball oscillated within said pump chamber.

5. The assembly of claim 2, wherein an eccentric pin driven by said shaft actuates said piston within said pump chamber.

6. The assembly of claim 2, wherein said level control valve includes a return flow passage communicating liquid from said pump back into said separator chamber.

7. The assembly of claim 6, including a supply line communicating fluid pressure within said separator chamber to said level control valve such that said level control valve closes said return passage and pressure within said pump chamber increases above said predetermined level to open said outlet valve.

8. The assembly of claim 2, including an inlet check valve for preventing liquid flow from said pump chamber back through said liquid feed passage.

9. The assembly of claim 1, wherein said shaft is supported on a hydrodynamic bearing assembly within said housing such that said shaft rotates on a cushion of liquid, said housing includes liquid passages to supply liquid to said hydrodynamic bearings and to exhaust liquid from said hydrodynamic bearings.

10. The assembly of claim 1, wherein at least one of said plurality of disks includes a cylinder attached about a circumference.

11. The assembly of claim 10, wherein said cylinder is substantially perpendicular to said disks.

12. The assembly of claim 10, further including a gap disposed between said cylinders attached to separate disks.

13. The assembly of claim 1, wherein each of said plurality of disks includes a plurality of openings disposed near said shaft such that said liquid/gas mixture flows between disks.

14. The assembly of claim 1, wherein said drive is an electric motor.

15. A rotary liquid/gas separator assembly for separating a liquid/gas mixture into separate phases, said assembly comprising:

a housing defining a separator chamber;

a liquid/gas inlet;

a shaft supported for rotation within said separator chamber and having a hollow section in communication with a gas outlet;

a plurality of disks attached to rotate with said shaft, said disks in frictional contact with said liquid such that rotation of said disks creates centrifugal force driving said liquid toward inner walls of said separator chamber;

a liquid outlet disposed within said housing and including a valve that opens in response to a predetermined pressure differential between liquid in said outlet and liquid in said separator chamber; and

a drive for rotating said shaft at a first speed generating a first pressure of said liquid within said separator chamber, and a second speed for generating said predetermined pressure differential.

16. The assembly of claim 15, including a pressure differential sensor for sensing a difference in liquid pressure and gas pressure.

17. The assembly of claim 16, wherein said pressure differential sensor is disposed within a pressure sensing port within said housing, said port in communication with a first pressure sensing passage in communication with an outer diameter of said separator chamber, and a second pressure sensing passage in communication with a point near said shaft.

18. The assembly of claim 15, wherein said drive rotates at said first speed until said pressure differential sensor indicates a pressure difference above a desired pressure indicative of a specific liquid level and then rotates said shaft at a second speed to generate said predetermined pressure differential for opening said outlet valve.

19. The assembly of claim 15, wherein said liquid outlet includes an opening tangential to said inner walls of said separator chamber.

20. The assembly of claim 15, wherein said shaft is supported on a hydrodynamic bearing assembly within said housing such that said shaft rotates on a cushion of liquid, said housing includes liquid passages to supply liquid to said hydrodynamic bearings and to exhaust liquid from said hydrodynamic bearings.

21. The assembly of claim 15, wherein at least one of said plurality of disks includes a cylinder attached about a circumference of said disk.

22. The assembly of claim 15, wherein each of said plurality of disks includes a plurality of openings disposed near said shaft and near an outer diameter of said disks for allowing flow of said liquid/gas mixture between said disks.

23. The assembly of claim 15, wherein at least one of said pluralities of disks includes a series of radial vanes disposed about an outer diameter of said disks.

24. The assembly of claim 15, wherein said drive is an electric motor.